

objected to claims 35, 54, 56, and 61 due to various informalities. The Examiner rejected claims 35, 38, 40, 42, 43, 45, 51, 54, and 56 under 35 U.S.C. § 102(b).

Applicant addresses each of the objections and rejections in turn.

I. Objection to the Drawings

The Examiner objected to the drawings based on minor informalities. Specifically, the Examiner noted that Figures 5 and 12 should be captioned as "Prior Art." The Applicant has submitted a drawing amendment for the Examiner's approval. The Applicant will present formal drawings upon indication by the Examiner of his acceptance of the proposed changes.

II. Objection to Claims 35, 54, 56, and 61

The Examiner objected to claims 35, 54, 56, and 61 based on minor informalities. Specifically, the Examiner noted typographical errors in these claims. These claims have been amended to correct the errors.

III. Rejection of Claims 35, 38, 40, 42, 43, 45, 51, 54, and 56 under 35 U.S.C. § 102(b)

The Examiner rejected claims 35, 38, 40, 42, 43, 45, 51, 54, and 56 under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent No. 5,013,131 ("*Fotheringham*"). The Applicant has amended independent claims 35 and 54 and respectfully traverses this rejection.

Claim 35 patentably distinguishes the present invention from *Fotheringham* in that it recites, for example, a single-mode optical transmission fiber for use in a wavelength-division-multiplexing system having carrier wavelengths in an extended wavelength range between about 1530 and 1650 nm; the fiber comprising a glass core including an inner core having a first refractive-index difference; a first layer radially surrounding the inner core along the length of the fiber and having a second refractive-index difference of less than zero; a second layer radially surrounding the first layer along the length of the fiber and having a third refractive-index difference; a third layer radially surrounding and adjacent to the second layer along the length of the fiber and having a fourth refractive-index difference of greater than zero; a glass cladding surrounding the glass core and having a refractive-index difference substantially equal to zero; wherein said second layer has a width in the range 1-5  $\mu\text{m}$  and said third refractive-index difference is, in absolute value, less than 40% of said second refractive-index difference.

Claim 54 patentably distinguishes the present invention from *Fotheringham* in that it recites, for example, a method for producing a single-mode optical fiber for use in a wavelength-division-multiplexing transmission system having carrier wavelengths in an extended wavelength range, comprising producing a preform having an inner core region with a first refractive-index difference; a first layer radially surrounding the inner core region along the length of the preform and having a second refractive-index difference of less than zero; a second layer radially surrounding the first layer along the length of the preform and having a third refractive-index difference; a third layer radially surrounding and in contact with the second layer along the length of the preform and

having a fourth refractive-index difference of greater than zero; and a glass cladding surrounding the core region and having a refractive-index difference substantially equal to zero; and drawing said preform, wherein the step of producing a preform comprises selecting said third refractive-index difference to be, in absolute value, less than 40% of said second refractive-index difference; and selecting a width of said second layer in the preform so that a corresponding layer in the drawn fiber has a width in the range of 1-5  $\mu\text{m}$ .

In contrast to claims 35 and 54, *Fotheringham* discloses a single mode optical fiber with a core, four layers, and an outer clad layer. For the optical fibers of Figures 4-8 in *Fotheringham*, the second layers, as identified by the Examiner, each have positive index differences and the adjacent third layers each have negative index differences. (*Fotheringham*, Figs. 4-7.) In contrast, claims 35 and 54, as amended, recite a second layer radially surrounding the first layer along the length of the fiber and having a third refractive index difference, and a third layer radially surrounding and adjacent to the second layer along the length of the fiber and having a refractive index greater than zero. Consequently, Applicant respectfully submits that independent claims 35 and 54, as amended, are patentable over *Fotheringham*.

Claims 38, 40, 42, 43, 45, 51, and 56 are allowable, at least for the reasons above regarding claims 35 and 54, and by virtue of their dependency upon those claims. Claims 36-37, 39, 41, 44, 46-50, 52-53, 55, and 57-58, objected to by the Examiner, are allowable as well, at least for the reasons above regarding claims 35 and 54, and by virtue of their dependency upon those claims. Accordingly, the Applicant respectfully requests withdrawal of the rejection of claims 36-58.

Applicant has added new claims 68 and 69 to fully claim the invention to which he is entitled. Applicant submits that new claims 68 and 69 are patentable over *Fotheringham* at least for the reasons above regarding claims 35 and 54.

In view of the foregoing, the Applicant respectfully submits that all the pending claims are patentable over the cited references. The preceding arguments are based only on the arguments in the Official Action, and therefore do not address patentable aspects of the invention that were not addressed by the Examiner in the Official Action. The claims may include other elements that are not shown, taught, or suggested by the cited art. Accordingly, the preceding argument in favor of patentability is advanced without prejudice to other bases of patentability.

Please grant any extension of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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APPENDIX TO AMENDMENT OF MAY 2, 2003

VERSION WITH MARKINGS TO SHOW CHANGES MADE

**AMENDMENTS TO THE CLAIMS**

35. (Amended) A single-mode optical transmission fiber for use in a wavelength-division-multiplexing system having carrier wavelengths in an extended wavelength range between about 1530 and 1650 nm, the fiber comprising:

a glass core including:

an inner core having a first refractive-index difference;

a first layer radially surrounding the inner core along the length of the fiber and having a second refractive-index difference of less than zero;

a second layer radially surrounding the first layer along the length of the fiber and having a third refractive-index difference;

a third layer radially surrounding and adjacent to the second layer along the length of the fiber and having a fourth refractive-index difference of greater than zero;

a glass cladding [surround] surrounding the glass core and having a refractive-index difference substantially equal to zero,

wherein said second layer has a width in the range 1-5  $\mu\text{m}$  and said third refractive-index difference is, in absolute value, less than 40% of said second refractive-index difference.

54. (Amended) A method for producing a single-mode optical fiber for use in a wavelength-division-multiplexing transmission system having carrier wavelengths in an extended wavelength range, comprising:

producing a [perform] preform having

an inner core region with a first refractive-index difference;

a first layer radially surrounding the inner core region along the length of the preform and having a second refractive-index difference of less than zero;

a second layer radially surrounding the first layer along the length of the [perform] preform and having a third refractive-index difference;

a third layer radially surrounding and adjacent to the second layer along the length of the [perform] preform and having a fourth refractive-index difference of greater than zero; and

a glass cladding surrounding the core region and having a refractive-index difference substantially equal to zero; and

drawing said preform,

wherein the step of producing a [perform] preform comprises:

selecting said third refractive-index difference to be, in absolute value, less than 40% of said second refractive-index difference; and

selecting a width of said second layer in the [perform] preform so that a corresponding layer in the drawn fiber has a width in the range of 1-5  $\mu\text{m}$ .

56. (Amended) The method according to claim 54, wherein the step of producing a [perform] preform comprises selecting a width of said second layer in the preform so that a corresponding layer in the drawn fiber has a width in the range of 2-4  $\mu\text{m}$ .

61. (Amended) The fiber according to claim 59, wherein the fiber has a dispersion value of at least 1.5 ps/nm/km over a wavelength range of about 1530-1650 nm.